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OPERATIONAL SUSTAINMENT -- MEANS, WAYS, AND ENDS GOVERNING JOINT AND COMBINED OPERATIONS

A Monograph

by

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This monograph examines the impact operational sustainment has on mid-high intensity operations in a semi-austere theater of operations. The analysis begins with the theory of sustaining operations at the operational level of war and the principles of current sustainment doctrine. A paradigm is developed for examining sustainment as an essential and critical part of operational art. In the paradigm, operational sustainment is defined as taking the logistical means available and applying them in a particular way while minimizing risk to achieve desired ends. The Sixth Army campaign on Luzon during World War II is analyzed using the operational sustainment paradigm to evaluate the impact of sustainment at the operational level of war. The monograph concludes that operational sustainment is the predominant factor when planning and conducting joint and combined operations and that the operational sustainment paradigm is a useful model for examining campaigns and major operations from a sustainment point of view.

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ABSTRACT

OPERATIONAL SUSTAINMENT -- MEANS, WAYS, AND ENDS GOVERNING JOINT AND COMBINED OPERATIONS by Major Van-George R. Belanger, USA, 46 pages.

This monograph examines the impact operational sustainment has on mid-high intensity operations in a semi-austere theater of operations.

The analysis begins with the theory of sustaining operations at the operational level of war and the principles of current sustainment doctrine. A paradigm is developed for examining sustainment as an essential and critical part of operational art. In the paradigm, operational sustainment is defined as taking the logistical means available and applying them in a particular way while minimizing risk to achieve desired ends. Logistics (personnel, material, transportation, facilities, and services) define the operational sustainment means used in this analysis. Logistics are applied using the sustainment activities of lines of support, staging, altering lines of communications, prioritizing, and force expansion as the sustainment ways. It is proposed that risk can be minimized by adhering to the sustainment imperatives of anticipation, integration, continuity, responsiveness, and improvisation.

The Sixth Army campaign on Luzon during World War II is analyzed using the operational sustainment paradigm to evaluate the impact of sustainment at the operational level of war. The monograph concludes that operational sustainment is the predominant factor when planning and conducting joint and combined operations and that the operational sustainment paradigm is a useful model for examining campaigns and major operations from a sustainment point of view.

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I. INTRODUCTION

The United States is committed to protecting its interests worldwide. The United States Armed Forces must be prepared to respond rapidly to crisis situations across the entire spectrum of conflict. Traditionally, the potential high intensity war in central Europe has received the greatest emphasis. During the late 1970's and early 1980's, low-mid intensity conflict came to the forefront. The failed Iranian hostage rescue, the crisis in Lebanon and Operation "Urgent Fury" in Grenada identified a need for improved joint operations campaign planning and execution.

Concurrently the United States Army identified a gap in its doctrine between strategy and tactics, the operational level of war. The 1982 and 1986 versions of FM 100-5 Operations, the Army's keystone warfighting manual, emphasized the central aspects of AirLand battle doctrine as "its recognition of the importance of the operational level of warfare , its focus on the seizure and retention of the initiative and its insistence on the requirement for multi-service cooperation."[1] FM 100-5 also cites the impact sustainment has on combat operations at the operational level of warfare. "Campaigns will often be limited in their design and execution by the support structure and resources in a theater of war."[2]

As the Chief of Staff of the U.S. Army, General Carl E. Vuono said in a recent article,

> "There is nothing clearer in the study of war than the need for adequate force sustainment. Time and again, successful commanders have demonstrated complete integration of sustainment considerations in their campaign planning."[3]

Considerable studies have been prepared, plans produced, and exercises conducted for conventional U.S. Armed Forces operating in a mature theater of operations such as central Europe and for Rapid Deployment Forces operating in a low intensity contingency operation such as Grenada. The purpose of this paper is to investigate the middle ground, a mid-high intensity war in a semi-austere theater of operations. The focus will be on operational sustainment of a joint task force and its effect on the conduct of operations in the theater. The analysis will begin with the theory of sustaining operations at the operational level and its development into current doctrine. A historical analysis of the Sixth (U.S.) Army in Luzon during World War II will be developed to identify key operational sustainment concepts, requirements, and functions. The focus will be on sustainment within the theater of operations and its implications concerning campaign planning.

II. OPERATIONAL SUSTAINMENT - THEORY AND DOCTRINE

> "When an army begins an operation, whether it is to attack the enemy and invade his theater of war or to take up positions along its own borders, it necessarily remains dependent on its sources of supply and replenishment and must maintain communications with them."[4]

Carl von Clausewitz' words from On War are as cogent today as when they were written. U.S. armed forces depend upon a firm logistical base, adequate sustainment, and a secure line of communications to conduct theater operations. These items are the prerequisites for a force's very existence and survival.

Since the bitter lessons learned from George Washington's harrowing experience at Valley Forge during the winter of 1777-1778, the United States has striven to raise and maintain its armed forces with all the necessary implements of war.[5] Although success in achieving this goal has varied, it is generally accepted that today the United States has one of the best equipped and maintained armed forces in the world.

An explanation of American operational sustainment doctrine, its theoretical basis, and some key terms, is the start point for this analysis. What is operational sustainment and what is its relationship to logistics? FM 100-5 states:

> Operational sustainment comprises those logistical and support activities required to sustain campaigns and major operations within a theater of operations. Operational sustainment extends from the theater sustaining base or bases which link strategic to theater support functions, to the forward CSS units and facilities organic to major tactical formations.[6]

Ideally, sustainment would provide everything necessary to conduct continuous operations without any loss of combat power The implied definition from Joint Chiefs of Staff (JCS) Pub 1 is providing and maintaining those levels of force, material, and consumables necessary to support a military effort at the level and for the duration required to achieve national objectives.[7] JCS Pub 1 goes on to define logistics as

> the science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services.[8]

Historian Martin van Creveld bases his definition of logistics "as the practical art of moving armies and keeping them supplied"[9] upon Baron De Jomini's explanation found in The Art of War which states

> "Logistics is the art of moving armies. It comprises the order and details of marches and camps, and of quartering and supplying troops; in a word, it is the execution of tactical and strategic enterprises.... Logistics comprises the means and arrangements which work out the plans of strategy and tactics."[10]

A comparison of the definitions of logistics and sustainment shows a strong similarity between them. The difference between logistics and sustainment is the difference between means, ways, and ends.

The following paradigm taught in the School of Advanced Military Studies by theoritician James Schneider will help explain the difference.

OPERATIONAL ART

MEANS + WAYS - RISK = ENDS

Operational art takes certain means, applies them in a particular way while minimizing risk to achieve identified ends.[11] Similarly, operational sustainment takes the logistical means available and applies them in a particular way while minimizing risk to achieve desired ends

LOGISTICS	+ APPLICATION	- RISK	= ENDS
(Personnel)	(Lines of Support)	(Anticipation)	(Continuous
(Material)	(Staging)	(Integration)	Support with-
(Transportation)	(Force Expansion)	(Improvisation)	out Loss of
(Facilities)	(Altering Lines of Communication)	(Continuity)	Combat Power)
(Services)	(Prioritizing)	(Responsiveness)	

Personnel, material, transportation, facilities, and services all come under the heading of logistics as the means of war available to achieve the desired ends. The application of the logistic means available involves the interface of combat activities such as maneuver, fires, and intelligence with the sustainment activities of lines of support, staging, altering lines of communications, prioritizing, and force expansion. The ways lines of support are established, maintained, and altered in a theater

of operations, logistics are staged and prioritized, and forces expanded will impact immensely on the ability of forces to sustain operations.[12] Risk can be minimized by adhering to the five fundamental imperatives of anticipation, integration, continuity, responsiveness, and improvisation.[13] This paradigm will be used to examine the sustainment of the Sixth Army in Luzon during World War II.

III. HISTORICAL ANALYSIS - THE LUZON CAMPAIGN

The Luzon campaign provides an excellent case study of the sustainment problems applied to almost every type of warfare: an amphibious assault on a hostile shore; open, mobile warfare in terrain suitable for the employment of armored equipment; mountain and jungle warfare; a combined airborne and amphibious assault; intense fighting in a large city; and large scale guerrilla operations.[14] The campaign, a joint and combined operation in the Southwest Pacific theater of operations, occurred on the Philippine island of Luzon from 9 January through 30 June 1945. Luzon, the major island in the Philippine Archipelago, was the home of the capital city, Manila; largest airfield, Clark Air Base; and the major ports, Subic and Manila Bays (Map 1). Located over six thousand miles from the west coast of the United States, and fifteen hundred miles from Australia and Japan, sustainment had a huge impact upon the strategic and operational campaign plans.

STRATEGIC SETTING

Based upon the premise that an invasion of Japan would be necessary to end the Pacific war, the allies had struck along two axis of advance through the southwest Pacific and the central

Pacific. A strategic triangle consisting of the south China coast, Formosa, and Luzon was evaluated from which to: 1) conduct the strategic bombing of Japan, 2) cut Japan's lines of communications to resources in Indochina, 3) secure a base of operations for the invasion of Japan.[15] The ensuing courses of action developed were: 1) invade Japan, bypassing Formosa and the Philippines, 2) secure Formosa, then invade Japan bypassing the Philippines, 3) secure the Philippines, then Formosa before invading Japan.[16] The idea of bypassing the Philippines was rejected for a variety of reasons, not the least being the political necessity and United States national obligation to liberate the Philippines and preserve American honor throughout the Far East. Many other reasons were sustainment related and can be analyzed using the sustainment paradigm.

The means were not available to conduct a direct invasion of Japan or Formosa. There was a shortage of between one hundred and two hundred thousand service troops within the Pacific theater required for the Formosa operation. It was estimated that the war in Europe would have to end by November 1944 in order to redeploy the forces necessary to support the operation. The Luzon operation could use loyal Filipinos to augment service troop strength. The Formosa operation would also require additional landing craft and ships, which were not available.[17]

The means available could best be applied by securing the Philippines first. The facilities of Clark Air Base, Manila and

Subic Bay would provide the lines of support and staging bases necessary to conduct future operations against either Formosa or Japan. Forces could be rapidly expanded on Luzon once the war in Europe ended and priority was shifted to the Pacific for the invasion of Japan. The Philippines were needed to cut the Japanese lines of communications to Indochina. The quarter of a million Japanese troops on Luzon posed too great a risk to friendly lines of communications. In addition, land-based aircraft from the Philippines would provide an air umbrella to cover resupply and reinforcement convoys sailing through the western Pacific. [18] The logistical means available and their proper application while minimizing risk led to the decision to conduct the Luzon operation.

> "In the last analysis then, logistical considerations alone would have forced the Joint Chiefs to the decision they reached in favor of Luzon..."[19]

On 3 October 1944 the Joint Chiefs directed General MacArthur to launch an invasion of Luzon on or about 20 December 1944.[20]

OPERATIONAL SETTING

General MacArthur divided his campaign plan for the invasion of the Philippines into four phases (Map 2).

> "First would come seizure of a foothold in the Southern Philippines, on southeastern Mindanao, in order to establish air bases for the support of the second phase. This would be a move into the central Philippines at Leyte, where MacArthur would develop major air and supply bases from which to stage and support the advance to Luzon. After the third-phase operations on Luzon had proceeded to the point at which necessary planes, ships, troops, and supplies could be released, fourth phase attacks would begin for the recapture of those islands in the southern Philippines that had been bypassed during the first three phases."[21]

Due to changing conditions the first phase was eliminated from the plan and Leyte was invaded on 17 October 1944.

The operational sustainment paradigm applies to MacArthur's campaign plan. The means, combat vessels and amphibious shipping, had to be borrowed from central Pacific resources under Admiral Nimitz' control. The means were applied at Leyte to develop sustaining bases and uninterrupted lines of support for the advance onto Luzon. The application of means on Leyte did not achieve desired ends due to unanticipated Japanese resistance and poor weather and soil conditions.[22] Thus bases on Leyte were not able to support the Luzon invasion until 30 December 1944. To minimize risk, Japanese land-based aircraft on Luzon had to be neutralized to prevent interdiction of friendly lines of communication. Also, it was anticipated that moon and tide conditions would be more favorable in January, so the Luzon invasion was rescheduled for 9 January 1945.[23]

Operational sustainment considerations are obvious in MacArthur's operation instruction number 73.

> 2.a. Forces of the Southwest Pacific, covered and supported by the Third Fleet, the 20th and 14th Air Forces, will seize and occupy Luzon, by overseas operations to seize a beachhead in Lingayen Gulf and thence by overland operations to destroy hostile forces and seize the Central Plains - Manila area, continuing operations to complete conquest of the entire island, all for the purpose of establishing bases to support future operations and reestablish the Philippine government.[24] [Emphasis added]

The General Headquarters Southwest Pacific (GHQSWPA) integrated operational sustainment missions into their specific directives. The very first directive in 1944 established lines of support as a priority mission.

> 3.a. The Sixth U.S. Army, supported by Allied Naval and Air Forces will:
>
> 1) By overwater operations seize and occupy beachheads in the Lingayen Gulf area as required to initiate and ensure uninterrupted naval and air operations in support of the continued offensive to seize the Central Plains - Manila area. [25] [Clark Air Base and Manila Bay]

FM 100-5 states that establishing lines of support is just as important to campaign planning today as in 1944.

LINES OF SUPPORT

> Maintenance of uninterrupted sustaining support throughout all phases of the operation or campaign is the central challenge of operational sustainment.[26]

The directives link other operational sustainment means and ways to the campaign ends. Directive Number Eight ordered Sixth Army to

> Establish facilities for minor naval operations at the earliest practicable date in the Lingayen area, Luzon, as arranged with the commander allied naval forces and be prepared to initiate the establishment of naval, air and logistic bases as later directed by this headquarters to support subsequent operations to complete the destruction of Japanese forces in the Philippines and to support future operations to the north and eastward of the Philippine Archipelago.[27]

The Sixth U.S. Army had received the mission to conduct the second largest amphibious operation in history. What was its operational plan and what was the impact of sustainment on it?

IV. SIXTH ARMY OPERATIONAL SUSTAINMENT PLANNING

The impact of operational sustainment on the mission Headquarters Southwest Pacific assigned to Sixth Army has been identified. The focus now is Sixth Army's campaign plan and the effect of sustainment on it.

Based upon the missions assigned by GHQSWPA, Sixth Army divided the operation into three phases (Map 3):

(1) Phase I: An amphibious assault to seize and consolidate beachheads in the Lingayen-Damortis area of Lingayen Gulf, and to initiate the establishment of air and base facilities therein.

(2) Phase II: An attack to destroy all hostile forces north of the Agno River and to seize and secure crossings of the Agno River.

(3) Phase III: The destruction of hostile forces in the Central Plains area; the continuation of the attack to capture Manila.[28]

The operation was to take four to six weeks to accomplish all three phases. Obviously, "seizing and consolidating beachheads", "establishment of air and base facilities", and "seizing and securing crossings" are all sustainment related and impact greatly on operational plans. An overview of the sustainment and logistical system organizations is necessary before the three phases are examined in detail using the operational sustainment paradigm.

During World War II, the United States Army Services of Supply Southwest Pacific Area was responsible for providing combat service support to ground forces and most air elements in the theater of operations. Naval forces were responsible for their own logistical support, although they could draw resources from the Army Services of Supply in emergencies. The Army air forces were responsible for specialized air force equipment and emergency air resupply operations for which it could draw stocks from the Services of Supply.[29] Under the Army Services of Supply the next support organization was the Sixth Army Service Command (ASCOM).

The Sixth Army Service Command was responsible for all logistical operations on Luzon from S-Day, the invasion target date, until it could be relieved by the Services of Supply on or about S+35.[30]

> The Sixth Army Service Command (ASCOM) was to establish air and temporary port and base facilities as directed. This agency, when directed, was to assume responsibility for the unloading of all units, supplies, and materials arriving in the objective area; for the dispersal, storage, and issuance of supplies to ground and air units; and, in coordination with the various Philippine Civil Affairs Units (PCAU's), for the recruitment, allocation, supervision, and administration of civilian labor. ASCOM was to initiate the establishment of air and logistic facilities, as directed, for the support of subsequent operations.[31]

ASCOM also divided the campaign into three phases: assault phase, ASCOM phase, and base phase.[32]

(1) Assault phase: S-Day to S+6 -- corps and divisions were responsible for all aspects of supply, construction, and beach operations in their respective zones of action under the general directions of Sixth Army.

(2) ASCOM phase: S+6 to S+35 -- ASCOM relieved corps and divisions of many logistical burdens. ASCOM assumed responsibility for most of the logistical support elements already ashore and all beach operations to permit the corps to push their tactical operations inland.

(3) Base phase: S+35 to completion -- United States Army Services of Supply assumed responsibility for logistical support on Luzon and all beach operations. ASCOM continued to support corps forward.

The three phases of the sustainment plan generally correspond to the operational plan's three phases. A more in-depth analysis of the three phases; assault, establishment of a lodgement, and operations inland in terms of logistical means available, the way they were applied, and the imperatives used to accomplish the mission will follow.

LOGISTICS -- OPERATIONAL SUSTAINMENT MEANS

When reflecting on operations in World War II we often visualize huge, almost limitless, logistical resources being available to operational commanders. We forget that often personnel, material, transportation, facilities, and services were limited due to worldwide shortages, competing theater priorities, and combat losses. Such was the case in the Luzon campaign. The usual shortage of service personnel and shipping available encountered in almost every theater throughout the war was present. There was a s[illegible]ge of artillery ammunition and portable bridging equipment. Also, the Philippine population on Luzon required extensive civil affairs support because of Japanese exploitation.[33] The logistical means available had a significant impact on the operational plan.

PERSONNEL

The following list defines the personnel strength allocated for the initial phase of the Luzon Campaign.[34]

Sixth Army Troops (Including Reserves)	36,844
I Corps -- 6th ID and 43rd ID	51,875
XIV Corps -- 40th ID and 37th ID	54,153
158th RCT	6,673
13th Armored Group	2,902
Allied Air Force	15,592
Army Service Comman d	32,577
Naval Service Comma nd	2,992
TOTAL	203,608

Approximately ninety percent of the troops listed above were scheduled for movement to Luzon during the period S-Day to S+12 inclusive. The force was divided almost equally among combat, combat support, and combat service support troops.

MATERIAL

Sixth Army directed the units listed above transport the following material to the objective area during the period S-Day to S+12.[35]

Class I, II. IV, VIII, IX	- 30 D/S (Days of Supply)
Class III	- 15 D/S
Class V Combat Units	- 5 U/F (Units of Fire)
Class V Non-Divisional Service Units	- 3 U/F

Sixth Army directed each unit arriving in the objective area from S-Day to S+12 carry the following minimum levels of supplies.

Class I, II, III, IV, VIII, IX	- 10 D/S
Class V	- 2 U/F

One unit of fire (U/F) in the Southwest Pacific area at the time of the Luzon Campaign was as follows:

M-1 rifle	- 100 rounds
81mm mortar	- 240 rounds
105mm howitzer	- 300 rounds

A unit of fire was the amount of ammunition one weapon would normally use in one day.[36]

Sixth Army directed that units arriving after S+12 carry the following supply levels:

Class I, II, IV, VIII, IX	- 30 D/S
Class III	- 10 D/S
Class V Combat Units	- 5 U/F
Class V Non-Divisional Service Units	- 3 U/F

By S+60 United States Army Services of Supply was to have 90 days of general supplies and equipment, 15 units of fire for mortars and artillery, and 10 units of fire for all other weapons in the objective area. Sixth Army modified the material authorized by applicable tables of organization and equipment for the Luzon operation as follows:

1. Assault units were stripped of all equipment not essential to the accomplishment of their mission.

2. Both combat and service units were to take to the objective area only such vehicles as were essential to the functioning of the unit.[37]

TRANSPORTATION

Shipping allocated to the Luzon Campaign consisted of three basic types: naval assault shipping functioning mainly as troop carriers but having secondary cargo-carrying capacities; naval assault vessels, whose primary function was transporting bulk cargo and vehicles but which also carried some troops; and merchant type cargo ships involved mainly in resupply operations.[38] The plan required an average discharge rate of 6,000 deadweight tons (DWT's) per day for the first thirty days and 10,000 DWT's per day for the next thirty days.[39] To accomplish resupply over and above that which accompanied units to the area of operations, Sixth Army scheduled the following resupply ships to arrive during the period S+2 to S+60.[40]

Standard supply ships (Appendix A)	- 22
Tankers	- 5
Supplementary supply ships	- 27
Ammunition ships	- 13
Air force standard supply ships	- 4
TOTAL	71

In addition, Sixth Army directed eight liberty ships be placed in reserve to compensate for losses due to enemy action or other accidents:

Class III	Ground Forces	- 2
Class III	Air Forces	- 2
Class V	Ground Forces	- 2
Class V	Air Forces	- 2

FACILITIES

Sixth Army was responsible for the construction of all facilities on Luzon until relieved by United States Army Services of Supply on or about S+35. Sixth Army utilized the Army Service Command and the Naval Service Command to develop the facilities outlined in Appendix B.

SERVICES

In addition to normally assigned Army service units, thirteen Philippine Civil Affairs Units (PCAU's) were formed and assigned to Sixth Army. From S-Day to S+60 Sixth Army provided twenty thousand tons of relief supplies for shipment to Luzon.[41]

The way Sixth Army applied the logistical means available while minimizing risk will be analyzed in terms of the operational sustainment paradigm. The three campaign phases provide the framework for the analysis.

APPLYING LOGISTICS -- OPERATIONAL SUSTAINMENT WAYS

Coordination of combat activities with the five sustainment activities is required to conduct successful campaigns and major operations within a theater of operations.[42] The application of the logistical means available; maintaining lines of support, establishing staging bases, altering lines of communications, prioritizing, and force expansion impacted significantly on Sixth Army's campaign plan. Each one of the five sustainment activities affected the planning and execution of the three campaign phases; amphibious assault, securing a lodgement, and operations inland.

LINES OF SUPPORT

FM 100-5 states that uninterrupted sustaining support must be maintained throughout all phases of the operation or campaign.[43] As previously stated, the first phase of the campaign was an amphibious assault to seize and consolidate beachheads in the Lingayen-Damortis area of Lingayen Gulf. During the assault phase, the corps and divisions were responsible for all aspects of supply, construction, and beach operations in their respective zones of action under the general directions of Sixth Army[44] (Map 4). The first step in establishing adequate lines of support was securing the sea lines of communication for

the amphibious assault forces and their supporting vessels. The Leyte invasion was conducted to provide bases to support the Luzon operation and neutralize the Japanese air forces on Luzon. The Leyte objectives were not achieved completely as 30 ships were sunk or damaged by enemy air and sea attacks enroute to and in Lingayen Gulf prior to S-Day. Consequently, the Commander Third Fleet cancelled scheduled air strikes against Formosa and made repeated sweeps of airfields in northern Luzon and the Lingayen Gulf area to protect the lines of support from Leyte to Lingayen Gulf.[45]

The assault locations were selected because of the way the lines of support reinforced the intended line of operations. The proximity of the Lingayen area to Port Sual with its fair harbor facilities and the airstrip which lay near the landing beaches were definite and important considerations. Also, the enemy threat in this area was the weakest and was not believed to have the capability to immediately interdict the beachhead support operation with indirect fire.[46] These landing areas provided the optimum lines of support for the first phase of the campaign.

As previously stated, Phase Two of the campaign was an attack to destroy all hostile forces north of the Agno river and to seize crossings of the Agno river establishing a secure lodgement area. During this phase ASCOM relieved corps and divisions of many of their logistical burdens and assumed responsibility for most of the logistical support elements already ashore to permit the corps to push their tactical operations inland.[47]

The Sixth Army designated the Army beachhead line 15 miles from the beaches (Map 4) only after careful thought had been given to several pertinent factors. Sufficient depth was needed to secure the area from air and long range artillery interdiction which would interrupt the line of support. The Sixth Army wanted to relieve the corps and divisions of logistical responsibility as early as possible. Once the Army beachhead line was secured an Army base area was established three and a half miles from the beach within which ASCOM assumed logistic responsibility on S+10.[48] The Army base area expanded as the corps moved inland with interior lines of support to the two corps radiating from the Army base area. The crossings on the Agno river were secured to provide continuous lines of support for the corps operations inland.[49]

The final phase of the campaign was to destroy hostile forces in the Central Plains and continue operations to seize Manila . During this phase ASCOM continued to support the corps forward while the Service of Supply Southwest Pacific Area, designated "Base M", assumed responsibility on S+35 for beach operations, base construction, and support southward down the Central Plains as far as the Army base area extended.[50] Continuous lines of support linking the theater base to the forward tactical formations was the driving force behind many of the Sixth Army's operational decisions.

STAGING

Sixth Army directed the assault phase of the operation include the establishment of air and base facilities within the beachhead, just as FM 100-5 states the requirement of staging sustaining bases forward as combat forces advance to avoid overextending lines of communication (LOC).[51] During the initial phase, sea lines of communication extended from theater support bases at Leyte, Hollandia, Bougainville, and other Southwest Pacific bases to the initial staging area, the various ships afloat in Lingayen Gulf. Convoys were scheduled to arrive in Lingayen Gulf on S-Day, S+1, S+2, S+4, S+8, and so on. This schedule was prepared so the Sixth Army could obtain the desired discharge rate without overcrowding the staging area. A shortage of escort vessels precluded a separate convoy on S+1. The S+1 echelon accompanied the S-Day convoy even though it did not unload until S+1 so Sixth Army could provide an even flow of troops, supplies, and equipment over the beaches.[52] The staging requirements dictated the forces operational movement.

During Phase Two, securing a lodgement, the Sixth Army designated the staging area necessary for initial air installations, dispersion of supply dumps, and deployment of support and follow-on forces as that area within the Army beachhead line and Army base area.[53]

This is in tune with current doctrine which states that

> "the operational commander must therefore seek to support each phase of his campaign efficiently and as the campaign progresses, adjust his LOC and support bases."[54]

Sixth Army established Base "M" in Phase Three of the campaign to provide continuous support of operations in the Central Plains and to seize Manila. In so far as practicable, ASCOM furnished all classes of supply from supply points maintained within 25 miles of forward troops to provide greater operational capability.[55]

ALTERING LINES OF COMMUNICATION

FM 100-5 states

> Ideally, lines of communication will be located so that shifts in operational direction can be accomodated without major adjustment of the sustaining effort.[56]

The Sixth Army selected the initial assault location because the long wide beaches offered access to excellent road nets and allowed greater freedom of action. Also, the close proximity of Lingayen airfield to the assault location permitted early establishment of air lines of communication (ALOC).[57]

The importance Sixth Army placed on being able to alter lines of communication is also evident in Phase Two of the campaign. Sixth Army desired that "the army beachhead include the main access roads leading to the south across the Agno River as well as an adequate lateral road net to facilitate ready shifting of forces when the time came to break out of the beachhead".[58]

PRIORITIZING

> In all operations, commanders will have to conserve sustaining resources and establish priorities for support. These priorities will normally be given to the most vital units for successful accomplishment of the mission.[59]

In cooperation with Allied Naval Force representatives Sixth Army prioritized its allotted shipping to best support the operational and logistical campaign requirements. Planners assigned the lift necessary for the two corps to each land two reinforced divisions on S-Day. During the remainder of the assault phase, the assigned division and corps support units landed in priority to avoid overtaxing beach operations.[60]

Annex B outlines the priorities the Sixth Army established for the construction of facilities which best supported the campaign plan. This plan provided the flexibility that enabled the commander to change priorities to take advantage of the situation. Sixth Army changed the planned all-weather airfields to dry-weather strips because expected good weather and rapid movement inland to Clark Airbase allowed shifting of resources to higher priority construction projects.[61]

As previously mentioned, Sixth Army directed assault units discard all equipment not essential to the accomplishment of their mission and reduce transportation assets by 50% to allow units to carry additional higher priority resources (e.g. food, fuel, and ammunition). Operations proceeded inland more quickly than anticipated due to Japanese resistance being lighter than

expected. Mistaken priorities almost halted the rapid advance down the Central Plains to Manila. The inadequate transportation assets authorized units and lack of bridging equipment, deemed not essential, almost caused the supply system to collapse halting the ground campaign.[62] The vehicles present operated twice as much over longer distances to maintain required support This increased wear and tear on the vehicles and left less time for scheduled maintenance. Vehicle repair parts requirements and nonoperational rates increased, placing a further burden on the support system. Priorities were shifted to fly in repair parts and ship in more vehicles to meet the increased demand. Sixth Army transferred truck companies from Leyte to Luzon to alleviate the transportation shortage.

FORCE EXPANSION

> As the force in a theater is enlarged, the commander must assume an appropriate balance of combat, combat support, and CSS forces at all stages of the expansion.[63]

Because of the great width of the front and to insure early seizures of beaches and vital river-crossings, Sixth Army put ashore the maximum combat force consistent with beach capacity. During this initial phase Sixth Army reduced the number of service troops and amount of material handling equipment to the minimum required for discharge operations under ideal conditions. Shallow gradients and bad weather resulting in less than ideal beach conditions on S+2 and S+3 required additional material

handling equipment which was unavailable and caused discharge operations to fall behind schedules. Rapid movement of combat forces inland taxed the undermanned service units beyond their capabilities.[64] The desire to maximize combat effectiveness by introducing the greatest possible number of combat forces exceeded the capacity of the support forces to sustain operations.

The logistical means available to Sixth Army and the ways Sixth Army applied those logistical means affected the planning and phasing of the campaign plan. Lines of support, staging, and altering lines of communications determined some of the missions and phasing of the campaign. Improper prioritizing and less than adequate initial force expansion affected the tempo of the operations. To achieve the end of continuous support without loss of combat power, the means available have to be applied properly while minimizing risk. The next section will examine how Sixth Army minimized risk to achieve its sustainment ends.

SUSTAINMENT IMPERATIVES -- REDUCING OPERATIONAL RISK

The logistical means available and the ways they are applied using the five sustainment activities must support the command's overall aims and plans to enhance the chance of success.[65] Yet, the unforseen difficulties that are characteristic of war often impede achievement of desired ends. Minimizing the impact of these difficulties on sustainment operations reduces the risk of not achieving continous support without loss of combat power.

Commanders and staffs must adhere to the sustainment imperatives of anticipation, integration, continuity, responsiveness, and improvisation to reduce risk and sustain the battle.[66] It is important that sustainment reduce operational risk by achieving continous and adequate support. Sixth Army sustainment operations during the Luzon campaign demonstrate the importance of adhering to the sustainment imperatives.

ANTICIPATION

> At the operational level, anticipation requires that sustainment planners visualize the entire course of a major operation or campaign while planning specifically for the phase that is under way.[67]

The Sixth Army sustainment planners visualized the course of the campaign into three phases: assault phase, ASCOM phase, and base phase. The sustainment phases generally corresponded to the three major operations phases discussed previously.

> The first phase was establishment of the beachhead, during which the major units were responsible for unloading ships, transporting supplies, and operating dumps. The second phase was defined as mobile warfare during which ASCOM assumed responsibility for unloading operations and established and operated central dumps from which organizations, using unit transport, drew supplies. During the third phase, Services of Supply assumed responsibility for base operations and ASCOM provided support forward.[68]

How well sustainment operations anticipate requirements determines an organization's agility, ability to seize and retain the initiative, and synchronize activities in depth. Sixth Army discovered that failure to anticipate can increase the risk of operational disaster. During the assault phase, Sixth Army

anticipated good weather and beach conditions, so provided only units and equipment for discharge operations under an ideal situation. A tropical storm made weather conditions anything but ideal on S+1 and S+2. Discharge operations slowed drastically and beaches became congested causing a supply distribution backlog which lasted until the end of the month. During the mobile phase, Japanese resistance was less than anticipated allowing combat forces to move rapidly inland. A shortage of available truck companies and Sixth Army's directive that units take only half their authorized vehicles to the objective area placed a severe strain on the transportation system as combat forces outdistanced support units.[69] Sixth Army took increased risk by not anticipating bad weather and an increased demand for vehicle transportation, resulting in a loss of agility, initiative, and combat power.

INTEGRATION

> Neither tactical or operational plans can succeed without fully integrated combat service support. The commander must assure that his overall operation is supported at every stage of its execution ... to give the operational or tactical commander the greatest possible freedom of action.[70]

The Sixth Army Service Command integrated its three sustainment phases with the Sixth Army operational phases. As previously discussed, the Sixth Army operational phases had specific sustainment objectives incorporated into them. To insure integrated support, ASCOM assumed most of the logistical burden from the corps at the earliest possible date. Thus, Sixth Army

centralized and integrated overall support requirements, capabilities, and operations. Sixth Army put the weight of effort where it belonged while tactical units devoted attention to operational requirements. Integration of operational sustainment with operational maneuver, fires, intelligence, etc., decreases risk and increases the chance of success.

CONTINUITY

> Sustainment cannot be interrupted for long without directly diminishing the combat power of a force. During operations, committed forces -- combat, combat support, and combat service support -- must receive continuous supply and service to sustain their fighting strength.[72]

The risk of not providing continuous sustainment must be minimized to achieve operational success. Sixth Army sustained units throughout the campaign through planned replenishment operations. As previously stated, resupply convoys scheduled in echelon provided continuous support without overtaxing capabilities. Standard supply ships (Appendix A) were the principle means of resupply. They provided all the required classes of supply for the force and minimized the risk of losing a large amount of one class of supply to enemy action. Sixth Army determined that the standard supply ship was the most practical method of continuous resupply for the first thirty to sixty days of an operation.[73] Also, Sixth Army demonstrated the emphasis placed on continous improvement of sustainment capabilities by the facilities development plan outlined in Appendix B.

RESPONSIVENESS

> In crisis or when fleeting opportunities arise, the sustainment system must react rapidly. ... At the operational level of war, the sustainment system must be able to meet extraordinary demands.[74]

Sixth Army minimized risk by developing a sustainment plan responsive to changing conditions and emergency demands. Sixth Army secured and repaired Lingayen airfield at the earliest possible date to be used for emergency air supply. Headquarters Southwest Pacific Area also directed the Services of Supply maintain a balanced stock of emergency supplies for the same reason. As previously discussed, Sixth Army prepared several reserve supply ships which permitted flexibility and compensated for combat losses.[75] The combination of these preparations reduced Sixth Army's risk of not being able to provide responsive support.

IMPROVISATION

> No matter how carefully commanders and planners try to anticipate events, unforseen contingencies arise in every conflict. In such situations, normal operating procedures must be suspended, unusual sources of supplies and transportation exploited, and exceptional risk accepted.[76]

Sixth Army faced such a contingency during the second phase of the campaign. Rapid operations inland and a lack of adequate ground transportation placed a severe strain on the Sixth Army's

ability to sustain operations. Sixth Army improvised solutions to these unanticipated events preventing a collapse of the supply system.

First, "all appropriate transportation within the Sixth Army was organized into provisional units to relieve the situation".[77] Also, Sixth Army recruited Filipino railroad men and laborers, repaired damaged railroad sections, and initially rigged a truck for use as an engine to put the railroad into operation. The early rehabilitation of the railroad prevented collapse of the supply system in the advance on Manila.[78] The Sixth Army's ability to improvise increased its chance to achieve its identified ends.

Sixth Army's ability to visualize the course of major operations, anticipate events and requirements, and provide continuous, integrated, and responsive support enhanced operational success. Adhering to the sustainment imperatives does indeed minimize risk associated with applying logistical means to achieve continous support without loss of combat power.

CONCLUSION

> The full potential of AirLand Battle Doctrine can only be realized when we are able to create necessary combat power at crucial times and places on the battlefield. Sustainment of that combat power is not solely a logistics issue. It is an essential and critical part of the operational art.
>
> General Carl E. Vuono

The purpose of this paper was to demonstrate the predominance of sustainment when conducting operational level joint and combined operations. The sustainment paradigm developed in Section II applied the theory of operational art to the central issues of means, ways, risk, and ends. As General Vuono says, sustainment of combat power is an essential and critical part of the operational art. The sustainment end is to provide continuous support without loss of combat power. It is indeed not solely a logistics issue. Logistics, personnel, material, transportation, facilities, and services are the means to achieve the end. Normally, the means will be limited and must be applied carefully to conserve combat power. The judicious application of the means using the sustainment activities of lines of support, staging, altering lines of communication, prioritizing, and force expansion will create the combat power to be applied at the crucial time and place. The risk inherent in all operations must be minimized to insure success. Adhering to the sustainment

imperatives of anticipation, integration, continuity, responsiveness, and improvisation will decrease risk. Then all the means available can be applied in the desired ways to achieve the sustainment end-state, continuous support without loss of combat power.

The Sixth Army operations in Luzon provide an excellent example of the impact of sustainment on joint and combined operations at the operational level of warfare. Operational sustainment was shown to be the governing factor in these operations and we should expect no less in the future.

Appendix A - STANDARD SUPPLY SHIPS[79]

These ships were one of the principal means of resupply during World War II operations in the Pacific. Their standard cargo for the Luzon Campaign was as follows:

1. QM - Class I - 30 D/S for 20,000 troops as follows:

   500,000 "B" rations.
   100,000 package type rations (10-1 and K)
   Hospital additions
   Gratuitous items for 600,000 rations

   Class II - 30 D/S for 20,000 troops

   Class III - 2,000 measured tons as follows:

   1,850 drums 80-octane
   1,850 drums diesel fuel
   30 D/S for 20,000 troops of all other items of Class III.

2. Medical - 30 D/S for 20,000 troops (2 MMU's).

3. Engineer - 200 tons assault and pioneer supplies and selected construction materials.

4. Signal - Classes II and IV - 30 D/S for 20,000 troops of certain standard maintenance supplies (batteries, wire, tubes, etc.)

5. Ordnance - Classes II and IV - Vehicle spare parts (2 1/2-ton, 1/4-ton, 3/4-ton and Dukw) - 30 D/S for 20,000 troops
   Replacement vehicles 24 2 1/2-ton trucks, 12 1/4-ton trucks, 12 250-gal water trailers, 10 Dukws

6. Chemical - Classes II and IV - 30 D/S for 20,000 troops

7. Lighterage - 2 LCM's

8. Cranes - one quickway crane

9. PX Supplies - 750 measured tons (includes 1/2 ration beer)

10. Stevedore gear - adequate for discharge of ship

Appendix B - FACILITIES DEVELOPMENT PLAN[80]

In general, facilities were planned to be developed as follows:

1. Air force facilities :

   a. By S+6 - one airstrip 100′ by 5,000′
   b. By S+15 - a total of two airstrips, one 100′ by 5,000 and one of 100′ by 6,000′ with a total of 36 hard standings
   c. By S+45 - extension of the 5,000′ airstrip to a 6,000 airstrip and completion of a total of 140 hard standings
   d. Operational buildings, bomb and ammunition storage areas, necessay all-weather access roads, camp facilities, and cargo unloading areas were to be constructed, concurrently with airstrip development

2. Naval facilities:

   a. PT unit advance base
   b. E6 mobile amphibious repair base
   c. Miscellaneous minor supporting installations

3. Petroleum storage and handling facilities

4. Base facilities:

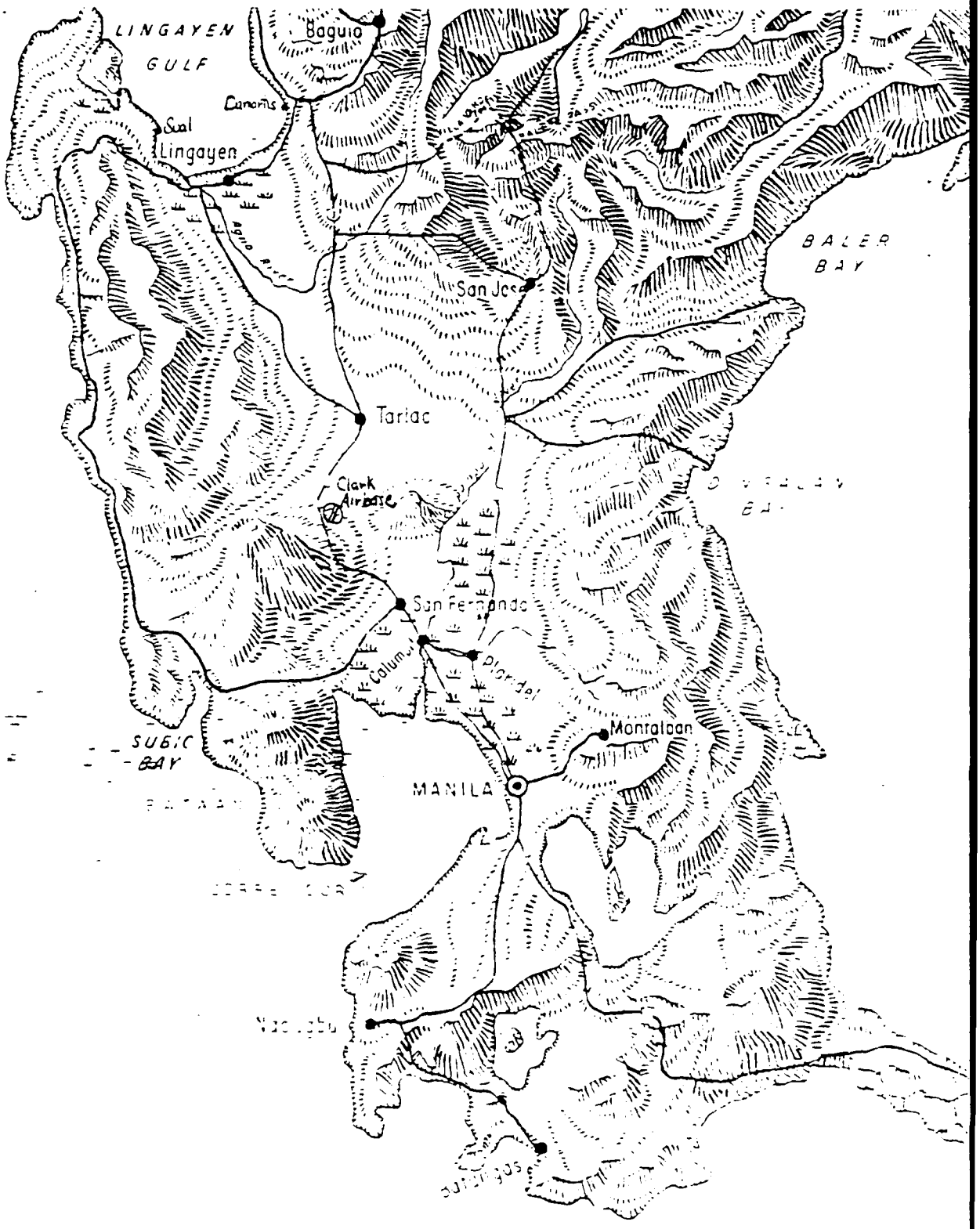
   a. Base to support 200,000 troops
   b. Port facilities as follows:
      LST landings as required

      20 lighter jetties, floating or fixed. Target date S+30

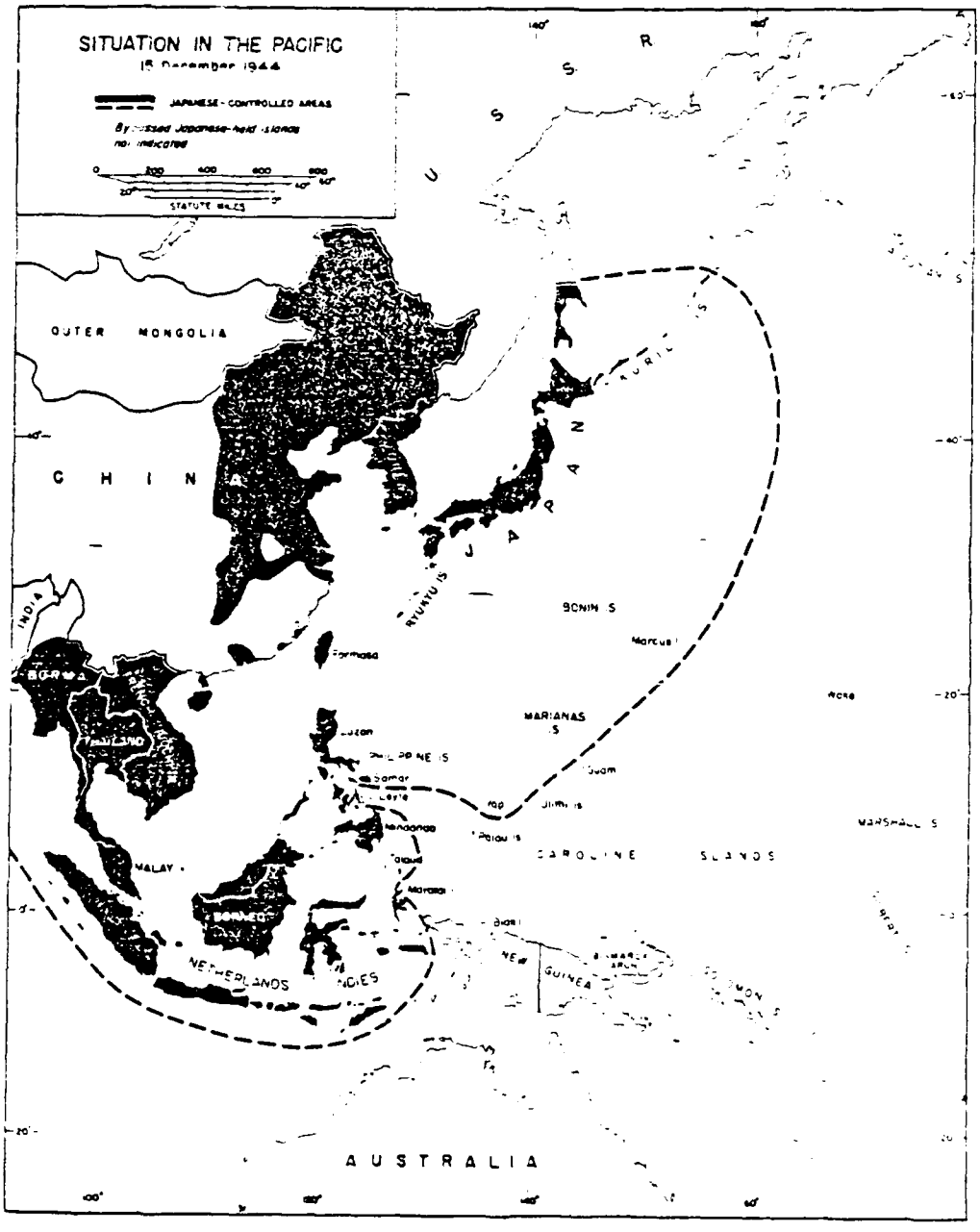
      Eight Liberty ship berths. Target date for first and second S+20 with completion of remainder within 45 days following occupation of areas suitable for port development

      One small ship wharf. Target date S+50

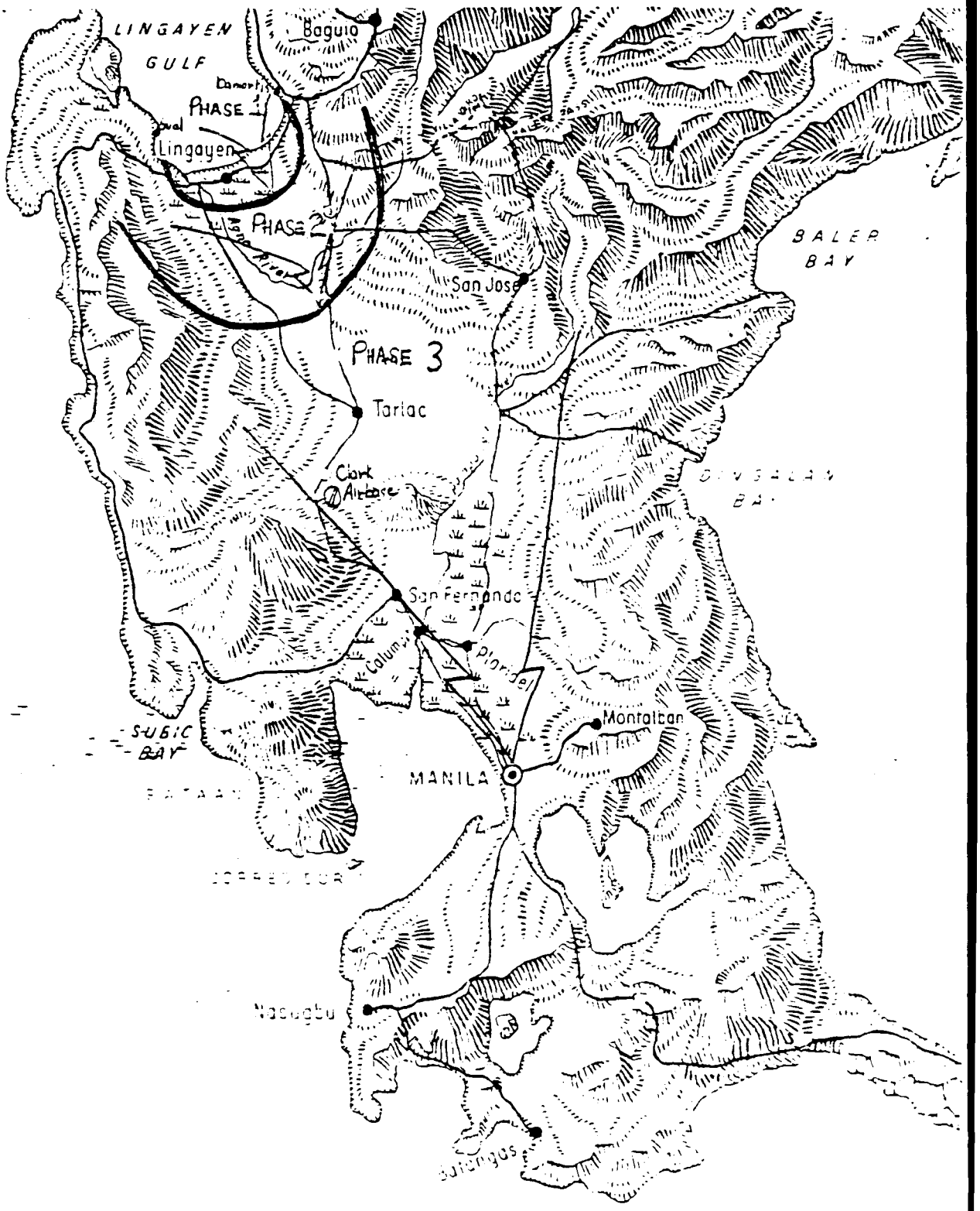
   c. Covered storage: Not to exceed 200,00 square feet
      Open storage: As required
   d. Hospitalization: 10,000 fixed beds under tentage to be established during the period S-Day to S+30
   e. Railroads: Existing railroad system to be rehabilitated during the combat phase on a priority next below that of road construction and maintenance
   f. Water supply: Water points as required



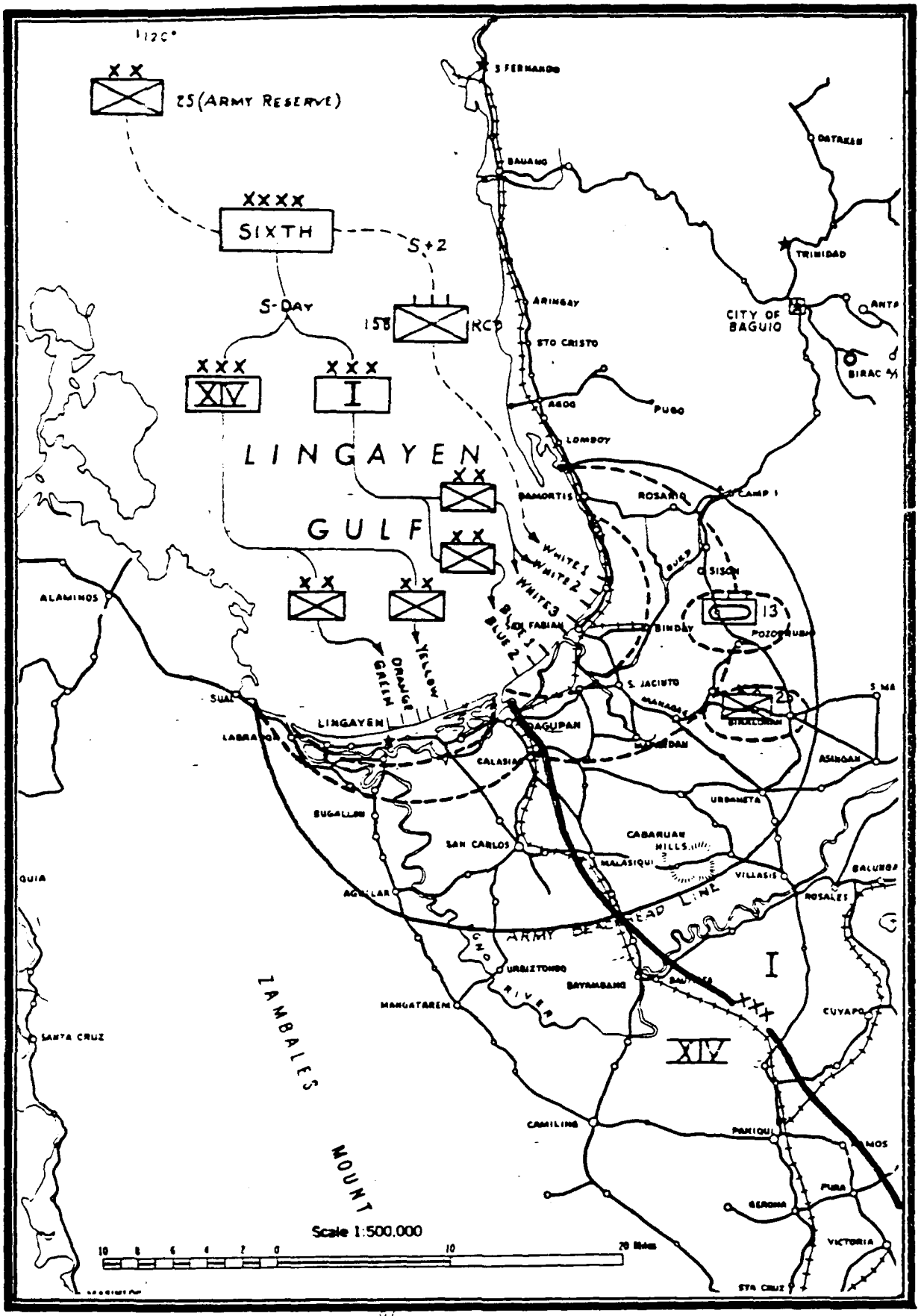
MAP 1[81] - LUZON



MAP 2[82] - SOUTHWEST PACIFIC



MAP 3[83] - OPERATIONAL PHASES



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MAP 4 - ZONES OF ACTION

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